CURRICULUM VITAE

Revised: May 28, 2003

1. Name: Andrew Karellas, Ph.D.

2. Office Address:

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5. Citizenship: Proprietary information deleted.

6. Current Titles and Affiliations:

- Professor of Radiology (with tenure) and Director of Medical Physics, Department of Radiology, Emory University School of Medicine.

Academic Appointments:

- Professor of Radiology (with tenure)

Primary Appointments:

- Department of Radiology

Joint and Secondary Appointments:

- Adjunct faculty: Department of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA. 1988 – 2002.
- Winship Cancer Institute, Emory University

Clinical Appointments:

- Director of Clinical Radiologic Physics, UMass Medical Center/UMass Memorial, 1985 – 8/2002.

7. Previous Academic and Professional Appointments:

- Instructor in Radiology, University of Massachusetts Medical School, 1/1984 - 12/1985.
- Assistant Professor of Radiology, Director, Radiologic Physics, University of Massachusetts Medical School, 12/1985 - 7/1989.

- Associate Professor of Radiology, Director of Radiologic Physics, University of Massachusetts Medical School, 7/1989 - 2/1998.
- Professor of Radiology (with tenure), and Director of Radiologic Physics, Department of Radiology, University of Massachusetts Medical School, UMass Memorial Health Care, 2/1998 – 8/2002.
- Adjunct faculty: Department of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA, 1988 - 2002.

Other Appointments:

- Member, Technical Staff, Department of Nuclear Medicine, University of Massachusetts Medical Center, Worcester, MA, 3/1979 - 8/1979.
- Member, Technical Staff (part time) Department of Nuclear Medicine, St. Vincent Hospital, Worcester, MA, 5/1979 - 8/1979.
- Postgraduate Researcher, Department of Radiological Sciences, Medical Physics Division University of California Los Angeles (UCLA), Los Angeles, CA.
- Graduate Student and Ph.D. Candidate, Department of Radiological Sciences, Medical Physics Division, University of California (UCLA), Los Angeles, CA.

8. Previous Administrative Appointments: N/A

9. Licensures/Boards:

- Current Medical Physics License, State of Texas.
- Current Medical Physics Registration, Commonwealth of Massachusetts.

10. Specialty Boards:

- Certification by examination from the American Board of Radiology: Diagnostic Radiologic Physics Specialty.

11. Education:

- B.S. Chemistry/Physics, Worcester State College, Worcester, MA.
- Ph.D. Medical Physics, University of California Los Angeles, (UCLA)

12. Postgraduate Training: N/A

13. Military or Government Service:

- I serve as a special government employee for committee advisory duty with FDA, 2001 - present.

14. Committee Memberships:

a. National and International:

Grant Review Committees, National Institutes of Health:

- Special Reviewer in the NIH Diagnostic Radiology Study Section directed by Dr. Catharine Wingate, October 18-20, 1989.
- Special Reviewer in the NIH Diagnostic Radiology Study Section, directed by Dr. Catharine Wingate, October 10-12, 1990.
- Member of NIH Special Study Section SSS-X-04, directed by Dr. Lee Rosen, February 21-22, 1993.
- Member of Special Review Committee of the National Cancer Institute; "Radiologic Diagnostic Oncology Group V: Stereotactic Biopsy for Non-palpable Breast Lesion Characterization, RFA CA-93-01, directed by Drs. Faina Shtern and Neal B. West, Chevy Chase MD, July 20, 1993.
- Outside Reviewer, NIH Special Study Section directed by Dr. Lee. Rosen, October 13, 1993.
- Member of Study Section "Monoenergetic X-ray Systems for Cardiovascular Imaging" RFA-NIH-93-HL-07-H, National Heart, Lung, and Blood Institute, directed by Dr. A. Premen, December 7, 1993.
- Member of NIH Multidisciplinary Special Emphasis review panel ZRG7 SSS- 7-19, directed by Dr. H. Baker, July 7-8, 1994.
- Member of NIH Special Scientific Review Section, Multidisciplinary Special Emphasis Panel ZRG7 SSS-X-29, directed by Dr. L. Rosen, March 14, 1994: Crystal City, VA.
- Outside Reviewer, NIH Special Study Section SSS-X directed by Dr. L. Rosen, February 1995.
- Outside Reviewer, Multidisciplinary Study Section, directed by Dr. L. Rosen, June 4-5, 1995.
- Member, NIH Multidisciplinary Special Emphasis Panels directed by Dr. L. Rosen, 1995, 1996, and 1997.
- Member, NIH Special Review Section DMG-1, directed by Dr. L. Rosen, June 23-24, 1997.
- Chair, NIH Diagnostic Imaging Study Section, DMG-1 directed by Dr. Rosen, October 21-22,1997.
- Member, NIH Diagnostic Imaging Study Section, DMG-1 directed by Dr. L. Rosen, October 11-12,1998.
- Member, NIH Diagnostic Imaging Study Section, DMG-1, directed by Dr. Eileen Bradley, February 17, 1999, and DMG-2 directed by Dr. L. Rosen, February 18-19, 1999.
- Chair, NIH Inaugural Imaging Bioengineering Research Partnerships Applications Program, July 12-13, 1999.
- Member, NIH Diagnostic Imaging Study Section, DMG directed by Dr. L. Rosen, October 17-19,1999.
- Member, Diagnostic Imaging Study Section, NIH, Washington DC, June 12-13, 2000.
- Chartered Member (four year term) Diagnostic Imaging Study Section of the Center for Scientific review, National Institutes of Health, October 2000 – June 2004.
- Chair, Diagnostic Imaging Study Section, NIH, starting term in October 2003.

- **Other Grant Review Committees:**

- Scientific Consultant to the Veterans Administration for evaluation of medical research proposal. Member of site visit team at the Long Beach, California Veterans Administration Medical Center, November 1985.
- Research Grant Reviewer for the Department of Veterans Affairs, 1990.
- Research Grant Reviewer for the Medical Research Council of Canada, January 1992.
- Research Grant Reviewer for the Medical Research Council of Canada, January 1993.

- Chair, US Army Medical Research Command Peer Review Panel on Breast Cancer, October 29, 1995.
- Chair, US Army Medical Research and Materiel Command Study Section on Breast Cancer Radiation # 3 Panel, October 29 - November 1, 1995.
- Member, US Army Medical Research Command Study Section on Breast Cancer, November 13, 1995.
- Scientific Grant Reviewer for the National Cancer Institute of Canada, December 1995 - April 1996.
- Member, US Army Medical Research and Materiel Command Study Section on Breast Cancer Radiological Sciences # 3 Panel, November 13-14, 1995.
- Member, US Army Medical Research and Materiel Command Study Section Extramural Defense Women's Health Research Program Peer Review Panel, January 21-23, 1996.
- Member, University of California Breast Cancer Research Program Grant Review Committee. March 31-April 1, 1996.
- Member, US Army Medical Research and Materiel Command Study Section on Breast Cancer, September 9-20, 1996.
- Member, US Army Medical Research and Materiel Command Study Section on Breast Cancer, 1997.
- Scientific Grant Reviewer for the Italian Ministry of Science and Technology, 1997.
- Member, US Army Medical Research and Materiel Command Study Section on Breast Cancer, 1998.
- Grant Reviewer for the Whitaker Foundation, 1998.
- Grant Reviewer: Italian Ministry for Universities and Research. Breast cancer detection techniques, July 1998, 2001.
- University of California Review Committee Technologies for Early Detection, Breast Cancer Research Program, San Francisco, CA, August 3, 1998.
- Member, US Army US Army Medical Research and Materiel Command, Programmatic Review Meeting, Diagnostic and Surgical Breast Imaging, March 1, 2000.
- Member, Scientific Review Committee for the California Breast Cancer Research Program, San Francisco, CA, April 6, 2000.
- Member, Scientific Review Committee for the California Breast Cancer Research Program, San Francisco, CA, March 2001, and 2002.
- Chair, Breast Cancer Research Program Study Section, US Army Medical Research and Materiel Command, August 16-18, 2000.
- Member, Scientific Peer-Review Panel on Breast Cancer Research, Department of Defense, US Army Medical Research and Materiel Command, Washington DC, August 2001.
- Member, Scientific Peer-Review Panel, American Institute of Biological Sciences, July 2001.

Other Committees Membership:

- Member, National Task Group on the Physics of Mammography, for establishing standards of performance. This effort was sponsored by the American Association of Physicists in Medicine, 1988-1990.
- Member of AAPM Task Group #7, Performance Specifications and Equipment Requirements for Mammography, 1989-1990.
- Chair of the Diagnostic X-ray Imaging Committee of the American Association of Physicists in Medicine, Jan. 1993 - Dec. 1998.

- Chair of AAPM Task Group # 15, "Digital Mammography for Stereotactic Localization" 1996-present.
- Member, Ad Hoc Committee on Mammographic Stereotactic Biopsy, Quality Assurance Guidelines, Society of Breast Imaging, 1996.
- Liaison to Physics Subcommittee, of the Radiological Society of North America Program Committee, Continuing Education Committee 1996-present.
- Member, Ad-Hoc Committee on Mammographic Stereotactic Biopsy Quality Assurance. Society of Breast Imaging, 1998-1999.
- Member of Consensus Panel on digital mammography digital displays and workstations; US Public Health Service, Office of Women's Health and National Cancer Institute, March 9-10, 1998.
- Member, Committee for Accreditation of digital mammography facilities. American College of Radiology, 1999-present.
- Association of University Radiologists, 2001-2002 Program Committee Abstract Reviews.
- Member, National Mammography Quality Assurance Advisory Committee of the FDA (2001-2004).

b. Regional and State:

- Worked with the Massachusetts Radiological Society and Commonwealth of Massachusetts Department of Public Health as scientific advisor to resolve radiation and image quality issues in the mammographic facilities accreditation process, 1992-1993.

- Member, Commonwealth of Massachusetts Breast and Cervical Cancer Early Detection Plan, Mammography Quality Assurance Subcommittee 1994-1995.

c. Institutional

University of Massachusetts Medical School/ UMass Memorial Medical Center

- Committee for Evaluation of Magnetic Resonance Imaging Technology, 1984 – 1987.
- Library and Learning Resources Committee, Sept 1986-1993.
- Scientific Council, ad hoc member, Jan 1989 - June 1989.
- Patent Policy Committee, Sept 1985 - June 1994.
- Patent Evaluation Subcommittee, 1997 - 2002.
- Member, Biomedical Imaging Group, Jan 1984 – 1990.
- Radiation Safety Committee and Subcommittee on Human use, January 1991- 2002.
- Member, Steering committee, Center for Advanced Clinical. Technology, June 1996 - 2002.
- Chair, Radiation Safety Committee of the UMass Memorial Medical Center and UMass Medical School, July 1997 - 2002.
- Member, University of Massachusetts Medical School Cancer Center.
- Member, Graduate School of Biomedical Sciences, 1998 - 2002.
- Institutional Biosafety Committee, April 2000 - 2002.
- Member, Radiology Chair Search Committee, University of Massachusetts Medical School, UMass Memorial Medical Center, appointed by the Chancellor.

15. Consultantships:

- Consultant on education relating to radiation issues, Digital Equipment Corporation, (1985 - 1988).
- Expert Consultant to legal counsel (Ford, Marrin, Esposito, Witmeyer, New York City) on radiological imaging related litigation, 1999 (without remuneration).
- Expert Mammography Image Quality Reviewer, American College of Radiology (2000 – present).
- Physics Examiner for oral physics boards for physicists, American Board of Radiology, 2000.
- American College of Radiology Subcommittee on digital mammography (1999-present).
- Scientific Reviewer on breast cancer grants for the State of California (2001, 2002).

16. Editorships and Editorial Boards:

- Associate Editor for Medical Physics, Member of the Board of Editors: (January 2002 – 2004).

17. Manuscript reviewer:

- Reviewer for American College of Radiology, mammography accreditation manuals, 1990.
- Reviewer for IEEE Transactions in Medical Imaging, 1997.
- Reviewer for Medical Physics Journal: 1986, 1991-1994, 1997, 1998, 1999, 2000, 2001.
- Guest Editor for Medical Physics Journal: 1995, 1996, 1997, 1998, 1999, 2000, 2001.
- Reviewer for IEEE Transactions on Nuclear Science: 1993, 1994, 1995, 1996, 1997,1998, 2000, 2001, 2002.
- Reviewer for Investigative/Academic Radiology: Member of committee for best basic science paper, 1993,1994.
- Reviewer for Academic Radiology: 1994, 1996,1999.
- Reviewer for Radiographics: 1999.
- Reviewer for ECRI Health devices monthly journal, 2000.
- Reviewer for the J. Clin. Appl. Med. Physics, 2001.

18. Honors and Awards:

- Hortense Fishbaugh Memorial Scholarship, UCLA, 1981.
- Louis B. Silverman Memorial Award of the Health Physics Society, Southern California Chapter, 1982.
- Distinguished Scholar Award, Alumni Association, UCLA.
- The Crump (Institute) Prize for Excellence in Medical Engineering, UCLA.
- Sigma Xi, The Scientific Research Society, 1984 - present.
- Fellow of the American Association of Physicists in Medicine, 2001
  (on the basis of scientific and professional accomplishments).

19. Society Memberships:

- President of the New England Chapter of the American Association of Physicists in Medicine, 1992.
- Massachusetts Radiological Society, Member of the Executive Board, 1994 – 1997.
- Chartered Member, Diagnostic Imaging Study Section of the Center for Scientific review, National Institutes of Health, October 2000 – June 2004.
- Associate Editor for Medical Physics, Jan. 2002- 2004.
- Member, National Mammography Quality Assurance Advisory Committee of the FDA (2001-2004).
- American Association of Physicists in Medicine.
- American College of Radiology.
- Society of Breast Imaging.
- Massachusetts Radiological Society (past member of the Executive Board).
- International Society for Optical Engineering.
- University of California, Los Angeles (UCLA) Alumni Association, Life Member.
- President of the New England Chapter of the American Association of Physicists in Medicine, 1992.
- Massachusetts Radiological Society, Member of the Executive Board 1994 – 1997.
- Chartered Member, Diagnostic Imaging Study Section of the Center for Scientific review, National Institutes of Health, October 2000 – June 2004.

20. Organization of National or International Conferences:

a. Administrative Positions:

- Radiological Society of North America, Annual Scientific Program Committee, Physics Subcommittee, American Association of Physicists in Medicine Liaison, 1994-1999.

- Executive Committee of the Massachusetts Radiological Society.

b. Sessions as Chair:

- Associate Chair, Scientific Session on Diagnostic Physics at the 27th Annual Meeting of the American Association of Physicists in Medicine, Seattle, Washington, August, 1985.

- Co-Chair of Scientific session on electron tubes and image intensifiers of The International Society for Optical Engineering, Electronic Imaging Science and Technology Conference, San Jose CA, February, 1992.

- Radiological Society of North America and American Association of Physicists in Medicine liaison for annual meting 1996 – 1999.

- Co-Chair, X-ray Imaging Session: Biomedical Engineering Society, 21st International Conference of the Engineering in Medicine Biology Society; October 10-13, 1999, Atlanta, Georgia.

- Session Moderator, American Association of Physicists in Medicine Annual Meeting, 1997, 1998, 1999, 2002.

- Presiding Officer, Scientific Sessions: Annual Meeting of the Radiological Society of North America (RSNA) 1996, 1997, 1998, 1999, 2000.

21. Research focus:

- My research is primarily focused on the early detection of breast cancer by advanced digital x-ray imaging techniques. Another aspect of my research is focused on the development of new x-ray detection technologies for x-ray fluoroscopy for cardiovascular imaging and cancer detection at a low radiation dose.

22. Patents

a. Issued Patents:

- **Karellas A:** Dual-Energy System for Quantitative Radiographic Imaging. Patent Number: 5,150,394, issued on September 22, 1992.

- **Karellas A:** System for Quantitative Radiographic Imaging. Patent number: 5,465,284, issued on November 7, 1995.

- **Karellas A:** Structured Scintillation Screens. Patent Number: 5,519,227, issued on May 21, 1996.

- **Karellas A:** Fiberoptic plates for generating seamless images. Patent Number: 5,572,034, issued on November 4, 1996.

- **Liu H and Karellas A:** Digital Imaging Using a Scanning Mirror. Patent Number: 5,572,037, issued on November 5, 1996.

- **Karellas A and Sayag M**: Digital Sensor Cassette for Mammography. Patent Number: 5,715,292, issued on February 3, 1998.

- **Karellas A**: System for Quantitative Radiographic Imaging. Patent Number: 5,864,146, issued on January 26, 1999.

- **Karellas A**: System for Quantitative Radiographic Imaging. Patent Number: 6,031,892, issued on February 29, 2000.

- **Karellas A**: System for Quantitative Radiographic Imaging. Patent Number: 6,445,767 issued on September 3, 2002.

Note: All patents have been assigned to the University of Massachusetts. Patents 5,150,394 and 5,465,284 have been licensed to two companies, Lunar Corporation now a division of General Electric (Madison WI) and Hologic (Bedford MA). Technology developed in the UMass laboratory with NIH funding has evolved into three commercially available products through

major equipment manufacturers. These technologies include the PIXI® heel bone densitometer that is used for osteoporosis screening, and the PIXImus® mouse bone densitometer that is used for testing mouse models in genetic and metabolic studies. These densitometers are manufactured and marketed worldwide by General Electric Corporation (GE Medical Systems) and are based on these patents. Another imaging technology that is used for digital imaging and stereotactic localization in breast biopsies has been co-developed by a scientific collaboration between Andrew Karellas and Fairchild Imaging, Inc. (Milpitas, CA) with NIH funding. The technology has been adopted by General Electric and is used in a commercially available product (GE Senovision®).

a. Pending:
Proprietary information deleted.

23. Grant Support:

a. Active Support:

1. Federally Funded:

1. Principal Investigator: **Andrew Karellas, Ph.D**.
   Title: High Resolution Cardiovascular Flat-Panel X-ray Imager
   Collaborators: Lockheed Martin Fairchild (now Fairchild Imaging)
   Estimated Funding Period: 7/1/2000-6/30/2004 (most likely up to 6/31/2005 after extension with budget)
   Grant type and number: R01 HL 65551
   Funding source: NIH: (National Heart, Lung and Blood)
   Status: Active.

2. Principal Investigator: **Andrew Karellas, Ph.D**.
   Title: Digital Mammography with a High Resolution Flat Panel Imager
   Collaborators: Lockheed Martin Fairchild (now Fairchild Imaging)
   Estimated Funding Period: 7/1/2001- 6/30/2004, (most likely up to 6/30/2005 after extension with budget)
   Grant type and number: R01 CA88792
   Funding source: NIH (Biomedical Research Partnerships- PAS-00-006)
   Status: Active (started in July 2001).

3. Principal Investigator: Devulapali Rao, Ph.D. (UMass Boston)
   Collaborators: **Andrew Karellas, Ph.D** and Carl J. D'Orsi, MD, scientific consultants.
   Title: Medical Image Processing using optical Fourier technique
   Estimated Funding Period: 8/1/2002 - 7/31/2004
   Grant type and number: R21 CA089673
   Funding source: NIH/NCI
   Amount: The total amount for A. Karellas and Dr. D'Orsi (Emory Univ. site) is about.
   Status: Active.

The following are excerpts from past peer-review summary statements from various NIH study sections:

"The investigator group is an outstanding one. Dr. Karellas has led his group in research of CCD based imaging techniques. .....The group has been productive and well funded. …….Investigator: Outstanding". Application Number: 1 R01 HL 65551 Summary statement from NIH dated 4/19/2000. The grant was funded for four years effective 8-1-2000.

"The investigators are very well qualified for this project and have demonstrated an outstanding record of accomplishment with their development of the cassette sized biopsy imager that is now commercially available. ……the UMass Group under Dr. Karellas is well known as pioneers in the field of digital mammographic imager"….Dr. Karellas is a well known and very respected physicist who is ideally qualified to lead this project". NIH Grant Application Number: 1 R01 CA88792. Summary statement from NIH, June 2000 with a score of 132. The percentile ranking was not reported because this was a special study section. NIH has notified us that our score is "within the NIH payline". This is a currently funded grant.

"The applicants present an ingenious proposal of considerable insight…(this work) ....well within the capabilities of this superior group of investigators" . NIH Grant Application Number: R01 CA 74106. NIH summary statement in 1997: This application was funded.

" Andrew Karellas obtained his Ph.D in Medical Physics from the University of California, Los Angeles. His pioneering work on CCD based mammographic imaging has been of a very high caliber and is characterized by thoroughness and attention to detail. Altogether, this is an impressive group…" Dated 11/21/1994. NIH Grant Application NumberR01 CA597770: The grant application was funded.

"….he (Andrew Karellas) has an impressive biographical sketch listing several awards…" Dated 3/30/1987. NIH Grant application number 1 R29 CA 45545-01. The grant application was funded.

2. Private Foundation Funded:

1. Principal Investigator: **Andrew Karellas, Ph.D.**
   Title: Imaging X-ray bone densitometer using charge-coupled device technology
   Grant type: This is a technology transfer program.
   Funding period: 7/96-2000

2. Principal Investigator: **Andrew Karellas, Ph.D.**
   Title: Radiologic Physics Laboratory Development
   Grant Type: Donation. Funds have been used for laboratory equipment
   Funding period: October 1996 – present

3. Contracts: N/A

4. Other (pending):

1. Principal investigator: Vivek Nagarkar, Ph.D. (RMD Inc.)
   Andrew Karellas, Ph.D., PI for Emory University site
   Title: A novel detector for digital mammography
   Grant type: NIH SBIR
   Funding period: 10/2002 - 9/2004
   Funding source: NIH/NCI

2. Principal investigator: Vivek Nagarkar, Ph.D. (RMD Inc.)
   Andrew Karellas, Ph.D., PI for Emory University site
   Title: Pixelated optical ceramics: A new approach for the early detection of breast cancer"
   Grant type: BCRP Proposal log no. BC021475, Department of Defense Medical Research
   Funding period: 1/2003 - 9/2004
   Funding source: NIH/NCI

b. Previous Support (all types)

1. Principal Investigator: **Andrew Karellas, Ph.D.**
   Title: Evaluation of Tuned-Aperture CT for 3-D Mammography
   Co-Investigators: Carl J. D'Orsi, M.D., Michael A. Davis. M.D.
   Funding source: National Cancer Institute
   Funding period: 8/1/97 - 7/31/2000, with no-cost extension to 7/31/2001
   Collaborators: Richard L. Webber, DDS, Ph.D. Wake Forest University, who developed the technique of Tuned-Aperture CT
   Status: Completed on 7-31-2001.

2. Principal Investigators: Carl J. D'Orsi, M.D. (UMass Subcontract)
   Co-Investigator: **Andrew Karellas, Ph.D.**
   Title: Stereoscopic Digital Mammography: Improving Diagnostic Accuracy
   David Getty, Ph.D. BBN Corporation, PI for the entire project.
   Funding period: 8/01/96 – 7/31/2000
   Funding source: US Army Medical Research and Materiel Command
   Status: Completed.

3. Principal Investigator: **Andrew Karellas, Ph.D.**
   Title: Digital mammography for needle guidance and spot views (CA59770).
   Co-Investigator: Carl J. D'Orsi, M.D.
   Funding dates: 4/1/96 - 7/30/99, with no cost extension to 5/31/2000
   Funding source: National Cancer Institute.
   Status: Completed.

4. R. Edward Hendrick, Ph.D., P.I. for the entire project
   Principal Investigators for UMass: Carl J. D'Orsi, M.D.
   Co-Investigator: **Andrew Karellas, Ph.D.**
   (Subcontract from the University of Colorado)
   Title: Digital Mammography Screening Demonstration Project.

Funding: period 3/1/96 – 3/31/2000
Funding source: US Army Medical Research and Materiel Command
Status: Completed.

5. Principal Investigator: **Andrew Karellas, Ph.D.**
   Title: Structured Phosphors for Medical X-ray Imaging
   Grant type: SBIR phase I.
   Funding period 3/1/96 - 8/31/96
   Status: Completed: 8/31/96.

6. Principal Investigator: **Andrew Karellas, Ph.D.** (for UMass subcontract)
   Co-Investigator: Carl J. D'Orsi, M.D.
   Title: Digital breast specimen radiography for improved biopsy
   Grant type: SBIR phase I application. UMMC is subcontract to Medoptics Corporation, Tucson, AZ.
   Funding period: 3/1/95 - 8/30/95
   Funding source: NIH
   Status: Completed: 8/30/95.

7. Principal Investigators: --- and **Andrew Karellas, Ph.D.**
   Title: Digital Mammography Pilot Project
   Grant type: Donation to Medical Physics Laboratory.
   Funding period: 1995-(no expiry date)
   Status: Completed.

8. Principal Investigator: Gerald Entine, Ph.D.
   Co-Investigators: --- and **Andrew Karellas, Ph.D.**
   Title: Intraoperative Imaging Probe for Delineation of Tumors
   Grant type: SBIR Phase II
   Funding period: 8/1/91 – 7/30/93
   Status: Completed.

9. Principal Investigator: Mary Costanza, M.D.
   Co-Investigators: C.J.D'Orsi, MD, H. L. Green, MD, **A. Karellas**, Ph.D.
   M. Wertheimer, M.D., J. Zapka, Ph.D.
   Title: Increasing the Community's Role in Breast Cancer Detection
   Grant type: NIH R01 CA44990-01
   Funding period: 4/1/87-3/31/91
   Funding source: NIH
   Status: Completed.

10. Principal Investigator: **Andrew Karellas**
    Title: New Fiberoptic Screens and Filtration for X-ray Imaging
    Grant type: R29 CA44545-01
    Funding period: 7/1/87-6/30/90
    Funding source: NIH
    Status: Completed.

11. Principal Investigator: **Andrew Karellas**
    Title: Optimization of Dual Photon Absorptiometry
    Grant type: Commercial Funding
    Funding period: 1/1/87-(no expiry date)
    Status: Completed.

12. Title: Breast Cancer Diagnosis by Light Scanning
    Principal Investigator: Carl J. D'Orsi
    Co-investigators: **Andrew Karellas**, Michael A. Davis, Edward H. Smith
    Grant type: R01 CA3797001A1.
    Funding period: 9/1/85 – 9/30/86
    Funding source: NIH
    Status: Completed.

13. Title: Reduced Dose Mammography using New Filtration Technique.
    Principal Investigator: **Andrew Karellas, Ph.D.**
    Funding period: 1984- 1985
    Status: Completed.

24. Clinical Service Contributions:

In addition to the teaching of the radiology residents, I have established a comprehensive quality assurance program with respect to image quality and radiation dose for the Department of Radiology at UMass Memorial Medical Center and its affiliates. This has included the federally mandated quality assurance of all mammographic systems within the UMass Memorial, University Campus.

Provided professional medical physics and educational services (though UMass) to the following facilities and affiliated institutions:

- Tri-River Family Health Center, radiography and mammography, a UMass Memorial facility (1993 - 2002).
- UMass Memorial, Worcester, Hahnemann Campus (as required).
- UMass Memorial Clinton Hospital, mammography (1997-2002).
- UMass Memorial, Memorial Campus, oversight of mammography physics quality assurance, stereotactic localization, and dental radiographic mobile unit (1998-2002).
- Worcester State Hospital radiographic and dental radiographic facility (1997-2002).
- Wing Memorial Hospital, Palmer MA, a UMass Memorial facility (1997-2002).
- Noble Hospital, Westfield, MA, a UMass Memorial affiliated facility (1998-2002).

25. Formal Teaching:

a. Medical Student Teaching

- Taught the basic principles of radiological physics and radiation protection to medical students taking the diagnostic imaging elective course. Informal Instruction is given to medical students

who participate in Radiological Physics research projects. University of Massachusetts Medical School, 1985- 2002.

b. Graduate Program

Training Programs

Residency Program

- Taught a comprehensive course on physics of diagnostic radiology, nuclear medicine and radiation protection to all residents in Radiology. This is a comprehensive and essential course that serves as preparation of the residents for their Examinations by the American Board of Radiology. University of Massachusetts Medical School, 1985- 2002.

- Taught an intensive exam preparation course on physics of diagnostic radiology, nuclear medicine and radiation protection to all residents in Radiology (without remuneration). This is a comprehensive and essential course that serves as preparation of the residents for their Examinations by the American Board of Radiology. St. Vincent Hospital, at Worcester Medical Center, Worcester, MA (2001).

c. Other categories:

- Taught a graduate level course on medical imaging, Department of Biomedical Engineering, Worcester Polytechnic Institute, Worcester, MA, 1992 and 1993.

- Gave several lectures each year to radiologic technologists, hospital nurses and cardiac catheterization laboratory technologists on the topic of radiation physics, health effects of ionizing radiation and radiation protection. University of Massachusetts Medical School, 1985-2002.

26. Supervisory Teaching:

a. Ph.D. students directly supervised:
Proprietary information deleted.

b. Post-doctoral fellows directly supervised: N/A

c. Residency program

Director of radiological physics education at UMass radiology residency program (1985 – 2002).

d. Other

<u>Students (M.S. and other)</u>
Proprietary information deleted.

27. Lectureships, Seminar Invitations, and Visiting Professorships:

(Last 5 years)

1. **Karellas A:** Phosphors and other pertinent issues in digital mammography. University of Michigan Department of Radiology, April 30, 1996.

2. **Karellas A:** A clinically useful spreadsheet for diagnostic imaging dosimetry. New England Chapter of the American Association of Physicists in Medicine, Fall meeting, Concord, MA, November 8, 1996.

3. **Karellas A:** Electronic medical x-ray imaging techniques. The International Society for Optical Engineering, Electronic Imaging East Conference, Boston, MA, November 1996.

4. **Karellas A:** Digital mammography: Is it for you? Lecture in special focus session. Annual Scientific Assembly of the Radiological Society of North America, Chicago, IL, December 5, 1996.

5. **Karellas A:** Electronic medical x-ray imaging: Current and emerging technologies. The International Society for Optical Engineering, Photonics East meeting, Boston MA, September 24, 1997.

6. **Karellas A:** Electronic Medical Imaging Techniques. The International Society for Optical Engineering, Electronic Imaging East, San Jose, CA, January 30, 1996.

7. **Karellas A:** Digital x-ray imaging with emphasis on mammographic applications. Medical Imaging. The International Society for Optical Engineering, Newport Beach, CA, February 22, 1997.

8. **Karellas A:** Electronic Medical x-ray Imaging Techniques. The International Society for Optical Engineering, Photonics West Conference, San Jose CA, January 27, 1998.

9. **Karellas A:** How safe are your procedures? X-ray, CT, MRI: Lecture at the conference: Imaging Strategies for the primary Care Physician, A. Davidoff, Program Director, Sturbridge, MA, May 23, 1997.

10. **Karellas A:** Digital mammography. Northeastern conference on radiological sciences, Springfield, MA, October 25, 1997.

11. **Karellas A:** Digital mammography. Plenary speaker, Annual Scientific Assembly of the Radiological Society of North America, Chicago, IL, December 1998.

12. **Karellas A:** Basic principles of digital mammography. Northeastern conference on radiological sciences, Springfield, MA, October 18, 1998.

13. **Karellas A:** Digital mammography. The International Society for Optical Engineering International Symposium on Medical Imaging, San Diego, CA, February 20, 1999.

14. **Karellas A:** Digital x-ray imaging in the new millennium. University of California, Los Angels, Department of Radiological Sciences, April 9, 1999.

15. **Karellas A:** Current status of commercial digital mammography equipment. Society of Breast Imaging and American College of Radiology, 4th Postgraduate Course, Boston, MA, May 28, 1999.

16. **Karellas A:** Digital mammography and other digital x-ray imaging trends. Department of Diagnostic Imaging, MD Anderson Cancer Center, Houston, Texas, July 31, 2000.

17. **Karellas A.** and Giger ME: Digital mammography and computer-aided diagnosis. SPIE's Medical Imaging International Symposium, San Diego, CA, February 2001.

18. **Karellas A:** Digital mammography: Physical aspects and emerging trends. Radiology Grand Rounds, University of Massachusetts Medical School, UMass Memorial Health Care, Worcester, MA. March 21, 2001.

19. **Karellas A:** Emerging technologies for full-field digital mammography. AAPM New England chapter, annual meeting, June 15, 2001.

20. **Karellas A:** Digital mammography: Current state of the art and accreditation issues. In the Proceedings of AAPM Summer School, 2001 Seattle WA.

21. **Karellas A.** Digital Mammography Performance Audits: Differences and Similarities. Breast Imaging and Medical Physics, Symposium on breast Imaging of the Southeast Chapter of the American Association of Physicists in Medicine. Pine Mountain, GA, March 28, 2003.

28. Invitations to National or International Conferences (recent):

1. **Karellas A.** Annual meeting of the American Association of Physicists in Medicine. Invited speaker, Emerging Clinical Digital Mammography Technologies, Montreal, July 15, 2002.

2. **Karellas A.** Radiological Society of North America, Annual Scientific Assembly. Invited speaker on the physical aspects of mammography. December 1-6, 2002.

3. **Karellas A.** International Symposium on Medical Imaging, The International Society for Optical Engineering. Lecture on Digital Mammography, February, 2003.

4. **Karellas** A, S. Vedantham, S. Suryanarayanan. Digital Mammography Technology: Performance audits and Accreditation Issues. American Association of Physicists in Medicine, August 2003.

29. Other Activities:

Invited speaker on many national and local conferences over the years.

30. Bibliography:

a. Published and accepted research articles in refereed journals:

1. Ling S, Rustgi S, **Karellas A**, Craven JK, Whiting JS, Greenfield MA, and Stern R: The measurement of trabecular bone mineral density using coherent and Compton scattered photons in vitro. Med. Phys. 9: 208, 1982.

2. Leichter I, **Karellas A**, Greenfield MA, and Craven JD: Comment on: A coherent/Compton method employing an x-ray tube for measurement of trabecular bone mineral density. Letter to the editor, Phys. Med. Biol. 28: 431, 1983.

3. **Karellas A**, Leichter I, Craven JD, and Greenfield MA: Characterization of tissue via coherent to Compton scattering ratio: Sensitivity considerations. Med. Phys. 10(5): 605-9, 1983.

4. Leichter I, **Karellas A**, Greenfield MA and Craven JD: The effect of the momentum transfer on the sensitivity of a photon scattering method for the characterization of tissues. Med. Phys. 11: 31, 1984.

5. Raptopoulos V, Fabian TM, Silva W, D'Orsi CJ, **Karellas A**, Compton CC, Krolikowski FJ, Doherty P, and Smith EH: The effect of time and cholecystectomy on experimental biliary tree dilatation: A multi-imaging evaluation. Invest. Radiol. 20: 276-286, 1985.

6. Leichter I, **Karellas A**, Shukla SS, Looper JL, Craven JD and Greenfield MA: Quantitative assessment of bone mineral by photon scattering I: Calibration considerations. Med. Phys. 12: 466, 1985.

7. Shukla SS, **Karellas A**, Leichter I, Craven JD and Greenfield MA: Quantitative assessment of bone mineral by photon scattering II: Accuracy and precision considerations. Med. Phys. 12: 447, 1985.

8. Shukla SS, Leichter I, **Karellas A**, Craven JD and Greenfield MA: Trabecular bone mineral density measurement in vivo: Use of the ratio of coherent and Compton scattered photons in the calcaneum. Radiology158: 695-697, 1986.

9. Raptopoulos V, Smith EH, Cummings T, Silva W and **Karellas A**: Bile duct dilatation after laparotomy: A potential effect of intestinal hypomotility. AJR 147: 729-73, 1986.

10. Raptopoulos V, Davis MA, Davidoff A, **Karellas A**, Hays D, D'Orsi CJ and Smith EH: Abdominal computed tomography with a fat-density and oral contrast medium: "fatCAT". Radiology 161: 332, 1986.

11. Raptopoulos V, Smith EH, **Karellas A**, Miranda DK and Tefft CA: Daytime constancy of bile duct diameter. AJR 148: 557-558, 1987.

12. Raptopoulos V, Davidoff A, **Karellas A,** Coolbaugh B, Davis MA, Smith EH: CT of the pancreas with a fat-density oral contrast regimen. AJR 150: 1303-1306, 1988.

13. Baran DT, Kelly A and **Karellas A,** Gionet M, Price M, Leahey D, Steuterman S, McSherry B, Roche J: Ultrasound attenuation of the Os calcis in women with osteoporosis and hip fractures. Calcif. Tiss. Int. 43: 138-142, 1988.

14. Kleinman PK, Blackbourne BD, Marks SC, **Karellas A** and Belanger PL: Radiologic contributions to the investigation and prosecution of cases of fatal infant abuse. New Eng. J. Med. 320: 507-511, 1989.

15. D'Orsi CJ, **Karellas A**, Costanza ME and Gaw VP: Preliminary report of an intervention to improve mammography skills of radiologists. Advances in Cancer Control VI: 151-157, 1989.

16. Baran D, Sorensen A, Grimes J, Lew R, **Karellas A,** Johnson B and Roche J: Dietary modification with dairy products for preventing vertebral bone loss in premenopausal women: A three-year prospective study. J. Clin. Endocrinol. Metab. 70: 264-270, 1989.

17. Yaffe MJ, Barnes GT, Conway BJ, Haus AG, **Karellas A**, Kimme-Smith C, Lin P P-J, Maudsley G, Rauch P, Rothenberg LN: Equipment requirements and quality control in mammography. Report of the task group No 7, Diagnostic x-ray imaging, AAPM report No 29, 1990.

18. Costanza ME, D'Orsi CJ, Greene HL, Gaw VP, **Karellas A**, Zapka JG: Feasibility of universal screening mammography: Lessons from a community intervention. Arch. Int. Med. 151: 1851-1856, 1991.

19. Agren M, **Karellas A**, Lahey D, Marks S, Baran D: Ultrasound attenuation of the calcaneus: Asensitive and specific discriminator for osteopenia in postmenopausal women. Calcif. Tiss. Int. 48: 240-244, 1991.

20. Kleinman PK, Belanger PL, **Karellas A**, Spevak MR: Normal metaphyseal radiologic variants not to be confused with infant abuse. AJR 156: 781-783, 1991.

21. Raptopoulos V, **Karellas A,** Bernstein J, Reale FR, Constantinou C, and Zawacki J K: Value of dual-energy CT in differentiating focal fatty infiltration of the liver from low-density masses. AJR 157: 721-725, 1991.

22. Gaw VP, Bush SM, D'Orsi CJ, Costanza ME, **Karellas A**, Dowd M, Zapka JG. A program to improve mammography skills of practicing radiologic technologists. Qual. Rev. Bull. 17(2): 48-53, 1991.

23. Gnatsios N, Mardirossian G, Matsushita T, **Karellas A**, Rajeevan N, Garcia M, Redus R, Fogarty M, Bacharach S, Brill AB. A portable CAMAC LAbView nuclear medicine imaging system. Physica Medica IX: 2-3, 1993.

24. **Karellas A**, Harris LJ, Liu H, Davis MA and D'Orsi CJ: Charge-coupled device detector: performance considerations and potential for mammographic imaging applications. Med. Phys.19: 1015-1023, 1992.

25. **Karellas A,** Liu H, Reinhardt C, Harris LJ, Brill AB: Imaging of radionuclide distributions with a low-noise charge-coupled device. IEEE Trans. Nucl. Sci. 40: 979-982, 1993.

26. Davidoff A, Reuter K, **Karellas A,** Baker SP, Raptopoulos V: Maternal Umbilicus: Ultrasound window to the gravid uterus. J. Clin. Ultrasound 22: 263-267, 1994.

27. Liu H, **Karellas A,** Harris LJ, D'Orsi CJ: Methods to calculate the efficiency of the lens in optically coupled CCD x-ray imaging systems. Med. Phys. 21: 1193-1195, 1994.

28. Kleinman PK, Diamond DA, **Karellas A**, Spevak, MR, Nimkin K, Belanger P: Tailored low-dose voiding cystourethrography for the reevaluation of vesicoureteral reflux in girls. AJR 162: 151-1154, 1994.

29. Liu H, **Karellas A**, Moore SC, Harris L, D'Orsi CJ: Lesion detectability considerations for an optically-coupled CCD x- ray imaging system. IEEE Trans. Nucl. Sci. 41: 1506-1509, 1994.

30. D'Orsi CJ and **Karellas A**: On line for Digital Mammography. Lancet 346: 263-264, 1995.

31. Diamond DA, Kleinman PK, Spevak M, Nimkin K, Belanger P, and **Karellas A**: The tailored dose fluoroscopic voiding cystogram for familial reflux screening. J. Urol. 155: 681-682, 1996.

32. Raptopoulos V, Baum JK, Hochman M, **Karellas A**, Houlihan M-J, and C.J. D'Orsi: High resolution CT mammography of surgical biopsy specimens, J. Comput. Assist. Tomogr. 20: 179-184, 1996.

33. Rothenberg LN, Nath R, Price RR, Hall TJ, **Karellas A**, Sobol WT, Yester MV, Zimmerman RE. AAPM. A perspective on the new millennium. Radiology 209(3): 600-3, 1998.

34. Liu H, Jiang H, Chen WR, **Karellas A**, Fajardo LL. Lens Distortion in Optically Coupled Digital X-ray Imaging. Med. Phys. 27(5): 906-912, 2000.

35. Vedantham S, **Karellas A**, Suryanarayanan S, Albagli D, Han S, Tkaczyk E, Landberg C, Opsahl-Ong B, Gransfors P, Levis I, D'Orsi CJ, Hendrick RE. Full Breast Digital Mammographic Imaging with an Amorphous Silicon-based Flat Panel Detector: Physical Characteristics of a Clinical Prototype. Med. Phys. 27: 558-567, 2000.

36. Vedantham S, **Karellas A**, Suryanarayanan S, Levis I, Sayag M, Kleehammer R, Heidsieck R, D'Orsi CJ. Mammographic Imaging with a Small Format CCD-based Digital Cassette: Physical Characteristics of a Clinical System. Med. Phys. 27: 1832-840, 2000.

37. Suryanarayanan S, **Karellas A**, Vedantham S, Glick SJ, D'Orsi CJ, Baker PB. Comparison of Tomosynthesis Methods for Digital Mammography. Acad. Radiol. 7: 1085-1097, 2000.

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39. Lewin JM, Hendrick RE, D'Orsi CJ, Isaacs P, Moss L, **Karellas A,** Sisney GA, Kuni CK, Cutter GR. Comparison of Full-Field Digital Mammography with Screen-Film Mammography for Cancer Detection: Results of 4,945 Examinations. Radiology 218: 873-880, 2001.

40. Suryanarayanan S, **Karellas A**, Vedantham S, Baker SP, Glick SJ, D'Orsi CJ. Evaluation of Linear and Non-Linear Tomosynthesis Reconstruction Methods for Digital Mammography. Acad. Radiol. 8: 219-224, 2001.

41. Suryanarayanan S, **Karellas A,** Vedantham S. Theoretical Analysis of Hybrid Flat-Panel Detector Arrays for Digital X-ray Fluoroscopy: General System Architecture, Signal, and Noise Processes. IEEE Sensors Journal 1: 168-174, 2001.

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43. Kleinman PK, O'Connor B, Nimkin K, Rayder SM, Spevak MR, Belanger PL, Getty DJ, **Karellas A**: Detection of rib fractures in infant abuse using digital radiography. Conditionally accepted in Pediatric Radiology, 2002.

b. Manuscripts submitted (or completed):

1. Vedantham S, **Karellas A**, Suryanarayanan S: X-ray attenuation characteristics of fiberoptic plates for digital mammography and other imaging applications. IEEE Journal of Sensors, *Submitted and under review*, February 2002.

2. Vedantham S, **Karellas A**, Suryanarayanan S: High-resolution CCD-based imager for fluoroscopic applications: System design. Manuscript is nearly complete and will be submitted to Medical Physics in 2003.

3. Vedantham S, **Karellas A**, Suryanarayanan S: High-resolution CCD-based imager for fluoroscopic applications: Cascaded linear systems-based model. Manuscript completed and will be submitted to Medical Physics in September 2003.

4. Suryanarayanan S, **Karellas A**, Vedantham S, Ved H, D'Orsi CJ: Impact of x-ray spectral conditions and antiscatter grid on the physical performance characteristics of a clinical full-field digital mammography system. Manuscript is completed and will be submitted to Medical Physics in 2003.

c. Review articles: N/A

d. Symposium contributions:

1. **Karellas A**, Ling S, Wong P, Craven JD, and Greenfield MA: In vivo measurement of trabecular bone mineral density by coherent/Compton scatter ratio. In: Proceedings of the 13th International Conference on Medical and Biomedical Engineering and the 6th International Conference on Medical Physics, Hamburg, Germany, September 1982.

2. Greenfield MA, Craven JD, Shukla SS, **Karellas A** and Leichter I: Determination of trabecular bone mineral density in the calcaneum, in vivo, by measuring the ratio of coherent to Compton scattered photons. In: Proceedings of the 14th International Conference of Med and Biol Engineering and 7th Int. Conference of Med. Phys., Helsinki, Finland 1985.

3. **Karellas A**, Tan N, Davis MA and D'Orsi CJ: Absorption and scattering properties of elemental filters for x-ray beams. In: Proceedings of the Int. Soc. Opt. Eng. (SPIE) 626:170-175, 1986.

4. **Karellas A**, Baran DT and Davis MA: Quality control aspects of dual-photon bone densitometry. In: Imaging Hardware and Software for Nuclear Medicine, King MA, Zimmerman RE and Links JK, eds., New York, American Institute of Physics, pp. 68-77, 1988.

5. Brill A B, and **Karellas A**: In Vitro Imaging In: New Trends in Pharmacokinetics. In: New trends in Pharmacokinetics, edited by: A. Resignio and A.K. Thakur, NATO series, Plenum Press, 1991.

6. **Karellas A**, Liu H, Harris LJ, D'Orsi CJ: Operational characteristics and potential of scientific-grade charge-coupled devices in x-ray imaging applications. Proc. SPIE 1655: 85-91, 1992.

7. Liu H, **Karellas A**, Harris LJ, D'Orsi C: Optical properties of fiber tapers and their impact on the performance of a fiberoptically coupled CCD x-ray imaging system. Proc. SPIE 1894: 136-147, 1993.

8. **Karellas A**, Liu H, Harris LJ, D'Orsi CJ: Digital mammography delivers quick, reliable images. Diagn. Imaging 16: 77-80, 1994.

9. **Karellas A**, Belanger PL, D'Orsi CJ: Digital mammography: A powerful tool in stereotactic localization and core needle biopsy. Mammography Today 1: 26-28, 1994.

10. **Karellas A**, and Behrman RH: Image quality and quality assurance, In: Study guide to computed tomography, Advanced applications, R. H. Behrman, editor, Clinical Communications Inc., Greenwich CT, 1995.

11. Dwyer SJ 3rd, Boehme JM, Cox GG, Huynh PT, **Karellas A**, Stewart BK, Vannier MW, Williams MB. Computer applications and digital imaging. Radiology 194(2): 616-8, 1998.

12. D'Orsi CJ, **Karellas A**. For Mammography, it's Digital vs. Screen-film. Diagnostic Imaging, Suppl. Digital: D16-8, 1999.

13. **Karellas A**, Hendrick RE: Equipment: Digital mammography. In Breast Imaging –Categorical Course Syllabus. Eds: P Dempsey and B Monses, ARRS Press, p. 1-9, 1999.

14. Hendrick ER, Lewin JM, D'Orsi, CJ, Isaacs, P, Moss L, **Karellas A**, Sisney GA, Christopher K. Kuni CK, Gary R. Cutter GR: Interim Clinical Evaluation of FFDM in a Screening Cohort: Comparison with Screen-film Mammography in 4,965 Exams. Presented at the International workshop on bone densitometry**,** Toronto Canada, June 2000.

15. **Karellas A**, Vedantham S, Sankararaman S, Belanger PL, D'Orsi, CJ. Digital mammography: Current state of the art and accreditation issues. In the Proceedings of AAPM Summer School, 2001.

16. Glick SJ, Vedantham S, **Karellas A**. Investigation of Optimal kVp Settings for CT Mammography Using a Flat-Panel Imager. Medical Imaging 2002: Physics of Medical Imaging, Larry E. Antonuk, Martin J. Yaffe, Editors, Proc. SPIE 4682: 392-402, 2002.

17. Suryanarayanana S, **Karellas A**, Vedantham S, Ved H, D'Orsi CJ: Screen-film vs. digital mammography: A perceptual analysis of post-processed hard copy images. Medical Imaging 2002: Image Perception, Observer Performance, and Technology Assessment, Dev P. Chakraborty, Elizabeth A. Krupinski, Editors, Proc. SPIE 4686: 312-318, 2002.

18. Suryanarayanan S, **Karellas A**, Vedantham S, Ved H, D'Orsi CJ: Theoretical and empirical characterization of the physical characteristics of a clinical digital mammography system. Medical Imaging 2003: Image Perception, Observer Performance, and Technology Assessment, Dev P. Chakraborty, Elizabeth A. Krupinski, Editors, Proc. SPIE [5030-101] 2003.

19. Suryanarayanan S, **Karellas A**, Vedantham S, Ved H, D'Orsi CJ: Evaluation of detection in compressed digital mammograms using a numerical observer, S. Medical Imaging 2003: Image Perception, Observer Performance, and Technology Assessment, Dev P. Chakraborty, Elizabeth A. Krupinski, Editors, Proc. SPIE [5034-62] 2003.

e. Book chapters:

1. Raptopoulos V and **Karellas A**: Technical considerations and dosimetry. In: Kleinman PK: Diagnostic Imaging of Child Abuse. Baltimore, Williams and Wilkins, 1987, pp. 263-276.

2. **Karellas A** and Raptopoulos V. Imaging Technologies: Physical principles and radiation safety considerations. In: Kleinman PK, Diagnostic Imaging of Child Abuse. Mosby Incorporated, Philadelphia, PA, 1998.

3. **Karellas A**, Vedantham S, Sankararaman S, Belanger PL, D'Orsi, CJ. Digital mammography: Current state of the art and accreditation issues. In the Accreditation Programs and the Medical Physicist. Medical Physics Monograph No. 27. Medical Physics Publishing, Madison, WI, 2001.

4. Reuter KL, **Karellas A**., Potential risks to fetus and mother from imaging studies. In: Women's Imaging. Mosby-Year Book, Inc., Philadelphia, PA (In progress).

f. Books edited and written: N/A

g. Book reviews:

- Diagnostic Ultrasound: Principles, Instrumentation and Exercises, 2nd ed., by Frederick Kremkau. Grune and Stratton, 1984. Reviewed for Radiology by V. Raptopoulos, and **A. Karellas.**

h. Manuals, videos, computer programs, and other teaching aids:
Various handouts and PowerPoint presentations for teaching radiology residents.

i. Other Publications: N/A

Abstracts from major scientific presentations

1. Ling S, **Karellas A**, Whiting JS, Greenfield MA and Craven JD: Measurement of bone mineral density by the coherent and Compton scattering technique. Med. Phys. 7: 434, 1980.

2. Ling S, **Karellas A**, Whiting JS, Craven JD and Greenfield MA: The effect of fat content in determination of bone mineral density by coherent to Compton scattering. Med. Phys. 8:579, 1981.

3. Hyodynmaa S, **Karellas A**, Whiting JS and Greenfield MA: In vivo measurement of the ultrasound attenuation coefficient in cortical bone. Med. Phys. 8: 555, 1981.

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8. Moss LJ, Reuter KL, Umali C, D'Orsi CJ, **Karellas A**: The questionable pulmonary nodule: The use of fluoroscopy for initial evaluation. Presentation and scientific exhibit. International Congress of Radiology, Hawaii, July 1985.

9. **Karellas A**, Davis MA and D'Orsi CJ: Spectrum shaping techniques for generating improved mammographic images. Radiology 157:(P): 332, 1985.

10. Quinn KL, **Karellas A**, Davis MA and Prien E Jr: Characterization of renal calculi by dual-photon absorptiometry. Radiology 157(P): 87, 1985.
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15. Baran D, Kelly A and **Karellas A**: Efficacy of calcaneal bone mineral measurement as a screen for vertebral and femoral osteopenia. Presented at the American Society for Bone and Mineral Research 1987 Meeting.

16. Kleinman PK, Blackbourne BD, Marks SC, Adams VI and **Karellas A:** A regional surveillance program for detection of fatal infant abuse. Presented at the Annual Meeting of the Radiological Society of North America, November 29-December 4, 1987. Recipient of Certificate of Merit.

17. Constantinou C, Zamenhof RG, **Karellas A** and Goodsitt MM: An epoxy resin-based reference phantom for bone density studies using QCT. Med. Phys. 14: 487, 1987.

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27. **Karellas A**, Harris LJ, and Davis MA: Design and evaluation of a prototype CCD-based imaging system for electronic radiography. Med. Phys. 16: 681, 1989.

28. **Karellas A**, Harris LJ, and D'Orsi CJ: Small field digital mammography with a 2048 x 2048 pixel charge-coupled device. Radiology 177(P): 288, 1990.

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31. Liu H, **Karellas A**, Moore SC, Harris L: Signal-to-noise ratio and lesion detectability in an optically-coupled charge-coupled device imaging system. Radiology 185(P): 202, 1992.

32. **Karellas A**, Liu H, Harris L, D'Orsi C: Physical characteristics and minimum requirements of charge-coupled device camera technology for mammographic preoperative localization. Radiology 185(P): 201, 1992.

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36. Liu H**. Karellas A**, Moore SC, Harris, LJ: Lesion detectability considerations for an optically coupled CCD x-ray imaging system. Accepted for presentation at the IEEE Nuclear Science symposium 1993, San Francisco.
37. **Karellas A** and Liu H: Small field digital mammography: A window to the digital mammography of the future. Invited speaker for the AAPM president's symposium. Med. Phys. 20: 948-949, 1993.

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39. **Karellas A**: Electronic medical x-ray imaging techniques. A three-hour course for optical engineers give at IS&T/SPIE Symposium on Electronic Imaging: Science and Technology. February 9, 1995 and repeated in 1996, San Jose, CA.

40. **Karellas A**: Lecture in a special focus presentation "Digital mammography: Is it for you? Radiology 201(P): 36, 1996.

41. **Karellas A**, Webber RL, Horton RA, Sechopoulos I, Levis I, D'Orsi CJ. Tuned Aperture Computed Tomography for 3-D Mammography. Poster presentation, American Roentgen Ray Society 1997 Annual Meeting, May 4-9, Boston, MA.

42. Levis I, Sechopoulos I, **Karellas A**, Glick SJ. X-ray phosphor performance in small format stereotaxic digital mammographic systems. Presented at the Annual Meeting of the American Association of Physicists in Medicine, Milwaukee, July 1997.

43. Sechopoulos I, Levis I, **Karellas A**, Belanger P, Bachtell RS. A new method for high-resolution digital radiographic absorptiometry. Presented at the American Society for Bone and Mineral Research 19th Annual Meeting, Cincinnati, OH, September 10-14, 1997.

44. Levis I, Sechopoulos I, **Karellas A**. Physical characteristics of a very large CCD for High Resolution Digital Mammography. Radiology 205(P): 302, 1997.

45. **Karellas A**, Sechopoulos I, Levis I, Huber AC, Pantazis JA. Measurement of the X-ray spectra and tube potential in mammographic units with a self-calibrating compact cadmium zinc telluride (CZT) detector. Radiology 205(P): 301, 1997.

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